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ABSTRACT

The United States Training and Employment Service General Aptitude Test Battery (GATB), first published in 1947, has been included in a continuing program of research to validate the tests against success in many different occupations. The GATB consists of 12 test s which measure nine aptitudes: General Learning Ability; Verbal Aptitude; Numerical Aptitude; Spatial Aptitude; Form Perception; Clerical Perception; Motor Coordination; Finger Dexterity; and Manual Dexterity. The aptitude scores are standard scores with 100 as the average for the general working population, and a standard deviation of 20. Occupational norms are established in terms of minimum qualifying scores for each of the significant aptitude measures which, when combined, predict job performance. Cutting scores are set only for those aptitudes which aid in predicting the performance of the job duties of the experimental sample. The GATB norms described are appropriate only for jobs with content similar to that shown in the job description presented in this report. A description of the validation sample is included. (AG)

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TECHNICAL REPORT

ON

STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY

FOR

DRESSMAKER 4-25.030

B-300 or S-59

TM 001 256

U. S. Employment Service in
Cooperation with
New York State Employment Service

U. S. DEPARTMENT OF LABOR
Bureau of Employment Security
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STANDARDIZATION OF THE GENERAL APTITUDE TEST BATTERY FOR DRESSMAKER 4-25.030

B-300 or S-59

Summary

The General Aptitude Test Battery was administered to two samples of students in their senior year of the Dressmaking course at the Central Needle Trades High School, a vocational high school operated by the New York City Board of Education. During the school year 1947-1948, the GATB, B-1001, was administered to 20 students; during the school year 1953-1954, the GATB, B-1002A, was administered to 35 students. The B-1001 raw test scores were converted to equivalent B-1002 raw test scores to permit combining the data of both groups. The total sample of 55 female students was used as the experimental sample for this study. The criterion used was the average grade-point ratings for vocational and related subjects in the seventh school term. On the basis of the statistical results obtained for the experimental sample and the job analysis data, the following aptitudes were found to be significant: (S) Spatial Aptitude, (P) Form Perception, and (F) Finger Dexterity.

GATB Norms for Dressmaker 4-25.030 - B-300 or S-59

Table I shows, for B-1001 and B-1002, the minimum acceptable score for each aptitude included in the test norms for Dressmaker.

TABLE I

Minimum Acceptable Scores on B-1001 and B-1002 for B-300 or S-59

B-1001			B-1002		
Aptitude	Tests	Minimum Acceptable Aptitude Score	Aptitude	Tests	Minimum Acceptable Aptitude Score
S	CB-1-F CB-1-H	90	S	Part 3	85
P	CB-1-A CB-1-L	90	P	Part 5 Part 7	90
F	CB-1-O CB-1-P	90	F	Part 11 Part 12	85

Effectiveness of Norms

The data in Table V indicate that 12 of the 20 poor students, or 60 percent of them, did not achieve the minimum scores established as cutting scores on the recommended test norms. Moreover, 29 of the 37 students who made qualifying test scores, or 78 percent, were good students.

TECHNICAL REPORT

I. Problem

This study was conducted to determine the best combination of aptitudes and minimum scores to be used as norms on the General Aptitude Test Battery for the occupation of Dressmaker 4-25.030.

II. Sample

The General Aptitude Test Battery was administered to two samples of students in their senior year of the Dressmaking course at the Central Needle Trades High School, a vocational high school operated by the New York City Board of Education. During the school year 1947-1948, the GATB, B-1001, was administered to 20 students; during the school year 1953-1954, the GATB, B-1002A, was administered to 35 students. The B-1001 raw test scores were converted to the equivalent B-1002 raw test scores to permit combining the data of both groups. All aptitude scores were expressed in terms of the B-1002 edition of the GATB. The total sample of 55 female students was used as the experimental sample for this study.

Table II shows the mean, standard deviation, range, Pearson product-moment correlation with the criterion, and the standard error of correlation for age.

TABLE II

Mean (M), Standard Deviation (σ), Pearson Product-Moment Correlation with the Criterion (r), and the Standard Error of Correlation (σ_r) for Age

Dressmaker 4-25.030
N = 55

	M	σ	Range	r	σ_r
Age (years)	17.1	.9	16-19	.347	.119

Age shows a significant correlation with the criterion at the .01 level. Correcting the criterion for age was not considered to be warranted. Data for education and work experience are not included since the entire group consists of high school seniors who had no occupational experience as Dressmaker.

III. Job Description

Job Title: Dressmaker 4-25.030

Job Summary: Makes dresses, cloaks, and similar garments completely after parts have been cut out by others. Does all hand and machine sewing according to patterns. May do altering by ripping and resewing. May cut cloth into dress parts.

Course Description: Although there is some variation in the courses and number of hours of credit among individuals in the seventh term at the Central Needle Trades High School who are taking the Dressmaking course, this variation is not great in the vocational courses. Inquiry of the school staff indicated that while individual course subjects have been modified to some extent in line with developments in the industry, the basic pattern and content of the course in 1947-1948 and in 1953-1954 are essentially the same. The same grading system was in use in both periods. A typical schedule for a student in the Dressmaking course consists of 18 credit-hours of Trade Dressmaking, 5 credit-hours of Applied Textiles, 3 credit-hours of Draping Costume Design, and 2 credit-hours of Related Art. In addition there are 10 to 12 credit hours in academic subjects. Academic subjects taken during the seventh term varied somewhat more than did the vocational subjects, but usually included English, Health Education, History, and Social Studies.

Among the objectives of the school course are the following:

To teach the fundamental skills of hand and machine sewing, particularly the operation of special machines.

To teach construction techniques used in custom establishments and in the wholesale industry.

To develop speed and accuracy in garment construction.

To teach the use and adaptation of commercial patterns.

To teach the techniques of fitting and altering garments.

To teach the techniques of patternmaking and draping.

To develop an appreciation of beauty, line and form in fashion design.

To develop good taste in the selection of appropriate ensembles for every occasion.

To acquaint the students with source material which may inspire the creation of original designs.

Graduates of this school may enter the industry in a variety of positions and at a number of levels. Typical of the jobs for which the dressmaking course provides training are the following:

Finisher - performs all hand sewing operations required to complete the garment.

Draper - in custom establishments makes the muslin patterns and prepares the garment for fitting. In the ready-to-wear field, checks the fit of the garment, pins major parts together on the dress form and marks for trimmings and findings.

Sample Maker - drapes the original dress pattern and makes the first garment.

Duplicate Maker - makes a garment in order to determine whether the pattern conforms to standard measurements.

Aptitudes S, P, and F were regarded as most pertinent to the understanding and assimilation of the concepts and techniques presented in the course, and to their practical application, on the basis of analysis of course content and job duties.

Aptitude S is necessary in order to develop speed and accuracy in garment construction, to learn patternmaking and draping, and to learn fashion design.

Aptitude P is necessary in order to use commercial patterns, and fit and alter garments.

Aptitude F is necessary in order to operate machines, construct garments, perform hand sewing operations, make patterns, and fit garments.

IV. Experimental Battery

All of the tests of the GATB, B-1001, were administered to the 1947-1948 sample. All of the parts of the GATB, B-1002A, were administered to the 1953-1954 sample. The B-1001 raw test scores obtained for the 1947-1948 sample were converted to equivalent B-1002 raw test scores. All aptitude scores were expressed in terms of the B-1002 edition of the GATB.

V. Criterion

The criterion used was the grade-point average achieved by each student during the seventh term (first half of the senior year) in vocational and related subjects only. Consideration was given to the inclusion of academic grades in the criterion but this idea was rejected because the academic grades are less relevant to the duties and tasks of the trade, and because of the low correlation between academic and vocational grades. The Pearson product-moment correlation between academic and vocational grades for this sample is .275 with a standard error of .125. Completely satisfactory estimates of the reliability of the criterion cannot be furnished here. The only basis for such an estimate is the correlation between vocational grade-point averages for two successive terms, taking only the major subject which was common to all students in both terms. Furthermore, the grades for two terms were available only for the 6th and 7th terms for the 1953-1954 group, and for the 7th and 8th terms for the 1947-1948 group. Within these limits, the correlations between grades for two successive terms are as follows:

1947-1948 group (7th and 8th terms)	$r = .427$	$\sigma_r = .188$	$(N = 20)$
1953-1954 group (6th and 7th terms)	$r = .661$	$\sigma_r = .097$	$(N = 35)$
Both groups (2 successive terms)	$r = .581$	$\sigma_r = .090$	$(N = 55)$

The Indices of Reliability ($\sqrt{r_{11}}$) derived from the above reliability coefficients are:

Index of Reliability (1947-1948 group) = .65
Index of Reliability (1953-1954 group) = .81
Index of Reliability (Both groups) = .76

These indices represent the correlation between the obtained grades and the hypothetical "true" grades. The actual reliability coefficients are, however, not as high as might be desired because of a number of contaminating factors. Among these uncontrolled factors might be mentioned differences in the content and activities of the subject from one term to the next, possible change of instructors, and motivational influences of class scheduling and the elective courses taken concurrently.

Table III shows the mean, standard deviation, and range of the criterion of grade-point averages in vocational and related subjects.

TABLE III

Mean (M), Standard Deviation (σ), and
Range of Grade-Point Averages in Vocational Subjects

Dressmaker 4-25.030
N = 55

	M	σ	Range
Grade-Point Averages	2.03	.53	.83-3.00

VI. Statistical and Qualitative Analysis

Table IV shows the means, standard deviations, Pearson product-moment correlations with the criterion, and standard errors of correlation for the aptitudes of the GATB. The means and standard deviations of the aptitudes are comparable to general population norms with a mean of 100 and a standard deviation of 20.

TABLE IV

Means (M), Standard Deviations (σ), Pearson Product-Moment Correlations with the Criterion (r), and the Standard Errors of Correlation (σ_r) for the Aptitudes of the GATB

Dressmaker 4-25.030
N = 55

Aptitudes	M	σ	r	σ_r
G - Intelligence	87.8	9.7	.210	.129
V - Verbal Aptitude	87.6	10.8	-.026	.135
N - Numerical Aptitude	88.4	13.8	.115	.133
S - Spatial Aptitude	95.5	13.3	.372**	.116
P - Form Perception	104.9	13.1	.429**	.110
Q - Clerical Perception	97.9	11.9	.033	.135
K - Motor Coordination	107.3	16.2	.056	.134
F - Finger Dexterity	110.3	18.5	.261	.126
M - Manual Dexterity	106.1	14.0	.285*	.124

**Significant at the .01 level.
*Significant at the .05 level.

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The statistical results were analyzed in conjunction with the job analysis data. As already indicated, the job analysis shows that Aptitudes S, P, and F appear to be the most important aptitudes in terms of the job duties and course content.

From Table IV, it may be seen that the highest mean scores were obtained for Aptitudes P, K, F, and M. All the standard deviations are below the general population norm of 20, with the sample exhibiting the greatest homogeneity on Aptitude G.

Aptitudes S and P show significant correlation with the criterion at the 1% level. Aptitude M shows significant correlation with the criterion at the 5% level.

Aptitudes S, P, and F were chosen for inclusion in the test norms. Aptitude S is important in the job analysis and shows significant correlation with the criterion. Aptitude P is important in the job analysis, has a high mean and shows significant correlation with the criterion. Aptitude F has the highest mean for the sample and is important on the basis of job analysis. Aptitude M was not included in the norms, although it showed significant correlation with the criterion at the 5% level, since its inclusion in the norms lowered their predictive efficiency.

Cutting scores on Aptitudes S, P, and F were set at one standard deviation unit below the mean and then adjusted to five-point score levels which yielded the best selective efficiency. For Aptitude P the cutting score was set at the five point score level nearest to one sigma below the mean, and for Aptitude S it was set at the higher adjacent five-point score level. The cutting score for Aptitude F was set at the five-point score level which is approximately one and one-half standard deviation units below the mean. This resulted in norms which consist of S - 85, P - 90, and F - 85.

In order to compute a tetrachoric correlation coefficient between the norms and the criterion and the Chi Square value to determine the significance of the relationship between these variables, the criterion was dichotomized by placing approximately one-third of the sample in the low criterion group. Students in the high criterion group were designated as "good students" and those in the low criterion group as "poor students." Table V shows the relationship between test norms consisting of Aptitudes S, P, and F with critical scores of 85, 90, and 85, respectively, and the dichotomized criterion of grade-point averages in vocational subjects in the dressmaking course.

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TABLE V

Relationship Between Test Norms Consisting of S-85, P-90, and F-85 and the Criterion

Dressmaker 4-25.030
N = 55

	Non-Qualifying Test Scores	Qualifying Test Scores	Total
Good Students	6	29	35
Poor Students	12	8	20
Total	18	37	55

$r_{tet} = .66$ $\quad X^2 = 8.760$

$\sigma_{r_{tet}} = .22$ $\quad p/2 < .005$

The data in the above table indicate a significant relationship between the test norms and the criterion for this sample.

VII. Conclusions

On the basis of mean scores, standard deviations, correlation coefficients, job analysis data and their combined predictive efficiency, it is recommended that Aptitudes S, P, and F with minimum scores of 85, 90, and 85, respectively, be used as B-1002 norms for Dressmaker 4-25.030. Equivalent B-1001 norms consist of S - 90, P - 90, and F - 90.